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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/512,949      | 02/25/2000  | Guang-Ho Cha         | AM9-99-0217         | 6841             |

7590

06/14/2002

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EXAMINER

PANNALA, SATHYANARAYA R

ART UNIT

PAPER NUMBER

2177

DATE MAILED: 06/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/512,949

Applicant(s)

CHA ET AL.

Examiner

Sathyanarayan Pannala

Art Unit

2177

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 February 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 19 April 2002 is: a) ☐ approved b) ☒ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |                                                                                              |                                                                             |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:                                          |

## DETAILED ACTION

### *Oath/Declaration*

1. A new oath or declaration is required because of non-initialed alteration is seen. The wording of an oath or declaration cannot be amended. If the wording is not correct or if all of the required affirmations have not been made or if it has not been properly subscribed to, a new oath or declaration is required. The new oath or declaration must properly identify the application of which it is to form a part, preferably by application number and filing date in the body of the oath or declaration. See MPEP §§ 602.01 and 602.02.

### *Drawings*

2. The drawings are objected to because they fail to show necessary textual labels of features or symbols in Fig. 3-7 as described in the specification. For example, placing a label "3D cell " with element 28 of Fig. 4, would give the viewer necessary detail to fully understand this element at a glance. A ***descriptive*** textual label for ***each numbered element*** in these figures would be needed to fully and better understand these figures without substantial analysis of the detailed specification. Any structural detail that is of sufficient importance to be described should be shown in the drawing.

Optionally, applicant may wish to include a table next to the present figure to fulfill this requirement. See 37 CFR 1.83. 37 CFR 1.84(n)(o) is recited below:

"(n) Symbols. Graphical drawing symbols may be used for conventional elements when appropriate. The elements for which such symbols and labeled representations are used must be adequately identified in the specification. Known devices should be illustrated by symbols which have a universally recognized conventional meaning and are generally accepted in the art. Other symbols which are not universally recognized may be used, subject to approval by the Office, if they are not likely to be confused with existing conventional symbols, and if they are readily identifiable.

(o) Legends. Suitable descriptive legends may be used, or may be required by the Examiner, where necessary for understanding of the drawing, subject to approval by the Office. They should contain as few words as possible."

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because of the following defects:

a) for Fig. 3, axes, items 26, 34, an arrow and no magnitude for  $p'$  should be labeled. Is  $\theta$  equal to  $\theta$  and 00, 01... represent what value.

b) for Fig. 4, items 28, 38 should be labeled.

c) for Fig. 3, 6 & 7, Axes, items  $d_{\max}$ ,  $d_{\min}$ ,  $\theta_1$  and  $\theta_2$  and  $p$ ,  $q$  and  $r$  should be labeled.  $d_{\max}$  and  $d_{\min}$  ranges should be given.

For Example:  $d_{\min}$  should be labeled with lower limit dimensionality. Also, it is suggested that ranges be specified in a table accompanying the figure.

What values/ranges for  $\theta_1$  and  $\theta_2$  and  $p$ ,  $q$  and  $r$ ? What is 0 with respect to origin?

$d_{\max}$  – upper limit for dimensionality.

4. The drawings are objected to under 37 CFR 1.83(b) because they are incomplete. Illustration is unclear with regards to elements 30, 32. What is PI? Element 30 represent a loop as read in the specification. However there is no standard symbol used to represent. 37 CFR 1.83(b) reads as follows:

When the invention consists of an improvement on an old machine the drawing must when possible exhibit, in one or more views, the improved portion itself, disconnected from the old structure, and also in another view, so much only of the old structure as will suffice to show the connection of the invention therewith.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. Failure to timely submit the proposed drawing will result in the abandonment of the application.

### ***Specification***

4. The disclosure is objected to because of the following informalities:

There is no provision in 37 CFR 1.71 for law interpretations of claim analysis in the detailed specification on pages 12-13. Applicant is required to delete paragraphs last part on pages 12-13 of the specification. See MPEP 608.01.

5. The use of the trademark Java<sup>TM</sup> has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Ex: Java<sup>TM</sup> used on page 6, line 21.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

It is also necessary to specify the Java™ version when using language-defined functions/components.

Appropriate correction is required. Please check the complete document.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The analysis under 35 U.S.C. 112, first paragraph, requires that the scope of protection sought be supported by the specification disclosure. The pertinent inquiries include determining (1) whether the subject matter defined in the claims is described in the specification and (2) whether the specification disclosure as a whole is to enable one skilled in the art to make and use the claimed invention.

7. Claims 1-24 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The enablement requirement necessitates a determination that the disclosure contains sufficient teaching regarding the subject matter claimed as to enable one skilled in the pertinent art to make and use the claimed invention. In essence, the

scope of enablement provided to one ordinarily skilled in the art by the disclosure must be commensurate with the scope of protection sought by the claims.

Currently, the most prevalent standard for measuring sufficient enablement to meet the requirements of 112 is that of "undue experimentation". The test is whether, at the time of the invention, there was sufficient working procedure for one skilled in the art to practice the claimed invention without undue experimentation. It is important to note that the test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, is it undue. A skilled artisan is given sufficient direction or guidance in the disclosure. Moreover, the experimentation required, in addition to not being undue, must not require ingenuity beyond that expect of one of ordinary skill in the art.

Undue experimentation and ingenuity would be required beyond one ordinarily skilled in the art to practice:

- 1) "dimensionality of 'd' " in claims 3, 8, 11 and 13;
- 2) " $d_{min1} < k\text{-NNdist}(q)$  " at claim 13;
- 3) "approximations " at claims 1, 8,15.

These approximations are based on the formula/expression or variable

" $K\text{-NN}_{dist}$ ". Thus, Approximation would cause undue experimentation.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

“A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.”

9. Claims 1-4, 8-12, 15-18, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fayyad et al. (US Patent 6,263,334) as applied to claims above, and further in view of “Converting Between Cartesian and Polar Coordinates”, (Apple Computers, Inc. 1996).

10. As per independent claims 1, 8 and 15, Fayyad rendered by the following:

“for at least some data vectors in a data space, generating respective approximations in polar coordinates.” Approximation is interpreted as probability function at Figs. 7 & 8, col. 7, lines 55-67 to col. 8, lines 1-14.

“based on the approximations, returning “k” nearest neighbors to the query.” at Figs. 2B, col. 4, lines 55-67 to col. 5, lines 1-3.



Fayyad does not teach explicitly polar coordinates. However, Apple computer, Inc. teaches converting Cartesian to Polar coordinates. Thus, it would have been obvious to one ordinarily skilled in the art at the time of the invention to convert Cartesian to Polar coordinates. It is an easy, simple and popular method of converting between Cartesian and Polar Coordinates.

11. As per dependent claims 2, 10 and 16, Fayyad rendered by the following:

“dividing the data space into plural cells” at Fig. 3A, col. 5, lines 4-8;

“representing at least one data point in at least one cell in polar coordinates with respect to the at least one cell.” at Fig. 3B, col. 5, lines 19-31;

12. As per dependent claims 3, 11 and 17, Fayyad rendered by the following:

“determining a number of “b” bits to be assigned to each cell.” at Fig. 4D, col. 7, lines 1-17;

“dividing the data space into 2<sup>bd</sup> cells.” at Fig. 4D, col. 7, lines 23-36.

13. As per dependent claims 4 and 18, Fayyad rendered “generating a candidate set of approximations based at least on the lower bounds d<sub>min</sub> of the approximations” at Fig. 9A, col. 12, lines 46-54.

14. As per dependent claim 9, Fayyad rendered “the means for generating generates respective approximations of data vectors p in local polar coordinates.” at Fig. 2, col. 8, lines 35-43.

15. As per dependent claim 12, Fayyad rendered “computer readable code means for generating a candidate set of approximations based at least on the lower bounds d<sub>min</sub> and upper bounds d<sub>max</sub> of the approximations. at Fig. 9A, col. 12, lines 46-59.

16. As per dependent claims 22, 23 and 24, Fayyad rendered "generating a candidate set of approximations based at least on the upper bounds  $d_{max}$  of the approximations." at Fig. 9A, col. 13, lines 7-10.

17. Claims 5-7, 13-14, 19-21 rejected under 35 U.S.C. 103(a) as being unpatentable over Fayyad et al. (US Patent 6,263,334) in view of "Converting Between Cartesian and Polar Coordinates", (Apple Computers, Inc. 1996) as applied to claims above, and further in view of Staats (US Patent 5,619,717).

18. As per claims 5, 13 and 19, "adding a first approximation having a first lower bound  $d_{min1}$  to the candidate set if  $d_{min1} < k\text{-NNdist}(q)$ , wherein  $k\text{-NNdist}(q)$  is the  $k$ th largest distance between the query vector  $q$  and nearest neighbor vectors  $p$ ." Fayyad and Apple Computers does not teach explicitly using vectors in nearest neighbor search. However, Staats teaches for determining the nearest neighbor of a data vector. (Figs. 2 & 4, col. 6, lines 62-67 to col. 7, lines 1-36). Thus, it would have been obvious to one ordinarily skilled in the art at the time of the invention decide to use a technique of finding the nearest neighbor of a data vector without searching all quantized vectors in a codebook. Staats technique accelerates the efficiency of vector quantization.

19. As per dependent claims 6, 14 and 20, Staats teaches "using the candidate set to return " $k$ " nearest neighbors vectors  $p$  to the query vector  $q$ ." at Figs. 5, col. 8, lines 62-67.

20. As per dependent claims 7 and 21, Staats teaches "not all vectors p corresponding to approximations in the candidate set are examined to return the 'k' nearest neighbors." at Figs. 5, col. 9, lines 1-4.

### ***Response to Arguments***

21. Applicant's arguments filed 4/19/02 have been fully considered but they are not persuasive.

Examiner respectfully traverses applicant's primary arguments.

First, applicant states that  $K\text{-}NN^{\text{dist}}(q)$  is clear. It is not clear whether to consider  $NN^{\text{dist}}$  as:

- a) single variable; or
- b)  $N$  times  $N^{\text{dist}}$  where  $N$  is a variable and  $\text{dist}$  is a power of  $N$ ;

It is well known as standard mathematical expression that  $K\text{-}NN^{\text{dist}}$  may represent  $K$  minus the quantity  $N$  times  $N$  to the power of the value  $\text{dist}$ . Is  $K\text{-}NN^{\text{dist}}$  a suggestion of an expression? Other interpretations can be considered, but the above are examples which would cause undue experimentation.

Second, the applicant states that the "dimensionality of  $d$ " is clear from the formula. Subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. See MPEP 2173.04. The broadest reasonable interpretation of " $d$ " could be constructed as any integer number. However, the specification does not support the claim language since the claim does not set

breadth limit or range of integers. The specification does support a dimension a dimensionality values of 2 and 3 on page 8, Fig. 3 & 4 of the specification.

Third, even though the first approximation with the first lower bound  $d_{\min 1}$  is stated in the summary, but it is not supported or explained more about it in the specification. The applicant states that  $d_{\min 1}$  is the first approximation, but the lack of details in the specification is enabling and leading to undue breadth. It also raises other questions like, what is the value/range for  $d_{\min}$ ?

### ***Conclusion***

22. The prior art made of record, listed on form PTO-892, and not relied upon, if any, is considered pertinent to applicant's disclosure.


23. If a reference indicated, as being mailed on PTO-FORM 892 has not been enclosed in this action, please contact Lisa Craney whose telephone number is (703) 305-9601 for faster service.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sathyanarayan Pannala whose telephone number is (703) 305-3390. The examiner can normally be reached on 8:00 am - 5:00 pm.

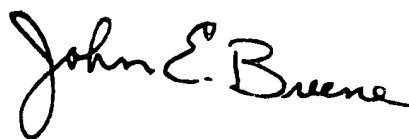
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (703) 305-9790. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Art Unit: 2177

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

  
Sathyanarayan Pannala  
Examiner  
Art Unit 2177

srp  
June 6, 2002

  
JOHN BREENE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100